Cancel. laminations connected at least at one end of the stator for imposing axial compression to predetermined level on the stator.

Cancel claims 23 and 24.

REMARKS

This Amendment is in response t the Office Action of February 23, 2001, in which the Examiner objected to the claim language calling for a flexible cable. While it is believed that the cable in the above-identified application is fully disclosed as being flexible, the claim language has been cancelled in order to expedite prosecution.

The Examiner rejected claims 1-22 over Brem et al. in view of Elton '165. According to the Examiner, Brem discloses a turbo-generator and Elton teaches a cable having semiconducting layers. The Examiner asserts that it would have been obvious to employ the cable of Elton as a winding in the machine of Brem.

Claims 10, 12 and 23 are rejected over Brem in view of Elton and Shildneck. The Examiner asserts that Shildneck teaches an improved continuous winding for an electromagnetic device and that it would have been obvious to have used the cable of Shildneck as disclosed by Brem and modified by Elton.

With respect to the Examiner's rejection of the claims based on Brem, Applicants assert that the reference merely shows a conventional low voltage machine. The stator of Brem has slots for a conventional winding and cannot accommodate the cable winding of the invention. For reasons outlined below with respect to the other cited references, Applicants argue that it would not be obvious to employ a high voltage cable of the invention as a winding in a conventional rotating electric machine. In particular, it would not be obvious to employ such a cable in a machine designed to operate at low voltage and

high current as in the arrangement of Brem. There is no suggestion that the arrangement of Brem would be advantageously improved by operation at higher voltage. The reference presupposes conventional machine operation at high current and relatively low voltage for a given power level, as opposed to the invention which operates at high voltage and relatively low current assuming the same power level.

In response to Applicants' arguments, the Examiner asserts that Elton's invention deals with a semiconducting layer with an insulated conductor. This is allegedly why Elton shows three different embodiments, namely in the windings of the dynamoelectric machine, electric cables and a shielded electrical housing. The Examiner asserts that in the art of motors, Elton discusses the problem of corona discharge, and since other various other variations of dynamoelectric machines, such as Shildneck and Siemens utilize a round cable, why would one skilled in the art not use the Elton cable.

The Examiner also questions Applicants' use of the term "cable."

The Examiner argues that the stiffness of the cable in Elton is a function of the insulation cable. Shildneck, for example, teaches that the rigidity of the conductor depends on the type of insulation used. Shildneck uses silicone rubber.

The Examiner's rejection of the claims is respectfully traversed for the reasons set forth below.

Applicants assert that the Examiner's analysis of Elton appears to assume that the cable of Elton is somehow equivalent of the windings in Shildneck and Siemens. First, Siemens and Shildneck do not use high voltage cables as windings in a machine. Shildneck uses a conductor which is segmented and has a hollow core. The Shildneck cable is specifically designed for conventional high current, low voltage applications. Low voltage is the objective of Shildneck. High current is why it is internally cooled. Siemens likewise

does not employ a cable. Siemens simply employs a round conductor in which the insulation increases with increasing voltage. In addition, another objective of Shildneck is to reduce the size of the insulation. Thus, the teachings of Shildneck and Siemens are essentially incompatible. Nevertheless, in response to the Examiner's inquiry as to why would one skilled in the art would not use the semiconducting layers to modify the existing cable, Applicants assert that Siemens and Shildneck are not concerned with high voltage operation and thus would not be induced to use such equipment in a conventional machine. Shildneck and Siemens simply do not contemplate high voltage operation, and they are thus not concerned with the problems associated with high voltage operations.

The Examiner's use of the dictionary definition of a cable to lump both dynamoelectric windings and cable windings together is believed to be improper. The definition of a cable as a bound or sheathed group of mutually insulated conductors does not describe the cable according to the invention. Applicants believe that the definition relied on by the Examiner is for a cable in which each of the wires is part of a different circuit. Indeed, in the present invention, each of the stranded conductors, except for perhaps one or two of the strands which are in contact with the semiconducting layer, have an insulation layer. The purpose of the insulation layer is to prevent eddy currents from passing between the strands. However, all of the strands operate at essentially the same voltage. In the cable that corresponds to the Examiner's dictionary definition, the mutually insulated conductors form separate circuits. The dictionary definition may be adequate for a general discussion, but Applicants would argue that a dictionary definition in a specialized technical area is not sufficient to define the thing being discussed. The broad definition is inadequate.

The Examiner's assertion that the Applicants' argument regarding the stiffness of Elton is dependent upon the insulation, ignores the fact that the so-called flexible insulation in Shildneck is only designed for low voltage, and even though it may be soft, if a high voltage were applied, corona discharge would occur and thereby damage the silicone rubber insulation. Thus, Shildneck would not operate properly at high voltage even if it is flexible. In order to have a high voltage cable, Elton provides a matrix of pyrolyzed glass in a resin. This makes the cable stiff. The pyrolyzed layer is for eliminating the problem of corona discharge in a high voltage cable. Shildneck is not concerned with high voltage, and thus is able to avoid the use of more expensive and complex insulation systems.

Applicants maintain their belief that the three separate embodiments disclosed by Elton are intended to illustrate applications of the material for use with conventional electric machines, conventional transmission and distribution cable and conventional shielded containers. There is nothing in Elton to suggest that the conventional cable would be a substitute for the conventional rigid bar type winding, especially since the conventional winding of a machine operates at low voltage and there would be no motivation to put a high voltage cable in a low voltage machine.

The Examiner's argument that the art of motors recognizes the problem of corona discharge is generally correct. However, the problem of corona discharge in conventional machines occurs in the end winding region where the stiff winding is formed in such a way that fairly high electric field stresses occur, especially where the stiff bars are bent and convoluted for connection to corresponding bars elsewhere in the machine. The very nature of the stiff winding makes the transitions between bars difficult to fabricate. These transitions result in high electric field stresses in the end winding region. Elton recognizes this problem in the end winding region, and provides a semiconducting layer to bleed off

the electric charge. Elton uses known grading near the stator to allow some of corona discharge to bleed off the stator. However, Elton offers no other solution to the problems in the end winding region. Strong electric fields will be present throughout the end winding region not just near the stator. The grading used in Elton will lessen the effects of the strong electric fields near the stator, but such a grading does not address the problems in the end winding regions away from the stator, especially if the voltage were to be increased as in the present invention.

Elton uses rigid conventional bar type windings to illustrate end winding control. These are able to withstand the mechanical stresses caused by induced fields between the windings in the end region where the fields are not contained in the winding. It is the mechanical rigidity of the winding that suppresses vibrations that might otherwise be present. At the same time, the rigid bar windings are a source of the electric field problems in the end winding region. The fact that the grading system is used to lessen end winding region problems near the stator supports the conclusion that Elton does not suggest or even contemplate the use of a cable as the winding in a machine because such a cable would not have the required grading nor would it be rigid. Elton does not recognize the problem which the invention seeks to remedy.

Shildneck does not address the problem of corona discharge, which to some extent could be reduced by using a thicker insulation, but which would render the machine impractical to build and which would permit heat to develop, something Shieldneck is trying to address by keeping the insulation thin and using a hollow conductor. Instead, one object of Shildneck is to reduce the thickness required of the ground insulation by producing a round conductor. In a conventional machine, which typically operates between 10 and 20 kV, and sometimes up to 30 kV, the end regions have electric field

control. Shildneck does not have any electric field control, which is not surprising for machines that are configured to operate at low voltages. Conventional machines use, for example, mica tape to provide resistance to partial discharge. Instead, Shildneck uses silicone rubber for ground insulation. However, if Shildneck would be subjected to high voltage, partial discharge would occur and the silicone rubber would eventually deteriorate.

The fact that Elton provides a rigid cable is also instructive when one considers how difficult, if not impossible, it would be to build a machine using the Elton cable. Bending the Elton cable would cause the pyrolyzed glass layer to crack and thus provide sites for partial discharge. The reason that Elton's cable is stiff is because it has two cured layers which include pyrolyzed glass and resin. It would be terribly difficult to build a flexible version of Elton's cable, install it in the machine and then cure it. Indeed, those of ordinary skill in the art would not consider such an alternative as a practical expedient.

In view of the foregoing, it is therefore respectfully requested that the Examiner reconsider his rejection of the claims, the allowance of which is earnestly solicited.

If filing this paper or any accompanying papers necessitates additional fees not otherwise provided for, the undersigned authorizes the Commissioner to deduct such additional fees from Deposit Account No. 04-2223.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

10. (Thrice Amended) A rotating electric machine comprising a wound stator having opposite ends formed of stator laminations and have stator teeth extending radially inwards from an outer yoke portion and a [flexible] winding comprising a first semiconducting layer, an insulating layer around the first layer, and a second semiconducting layer around the insulating layer, and an axially running clamping device electrically insulated from the stator laminations connected at least at one end of the stator for imposing axial compression to predetermined level on the stator.